Space Weather Forecast

Issued on Tuesday, 19 July 2022 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1/Minor Storms mainly day 1 (19th). Decreasing chance of Moderate flares (R1/R2 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the last 24 hours, with only common class flares observed. There are eight sunspot regions on the visible disc, although a large region is soon expected to rotate off the southwest limb. The main activity is from a region in the southwest, which was the source of a long-duration flare, with another flare from the region in the northwest disc. All other regions are smaller and either stable or decaying. The long duration flare from the southwest sunspot had an associated CME (coronal mass ejection), however this has yet to be analysed for an Earth-directed component.

Solar Wind / Geomagnetic Activity: The solar wind, as observed at L1, persisted at slightly elevated speeds of around 400 km/s, before a marked enhancement at 18/2035 UTC to 470 km/s. This was accompanied by the magnetic field also showing a notable increase from being weak to moderate, but with the bulk of this strength associated with a north-directed field. This suggests a CME arrival, however the only forecast CME is not expected until later on the 19th or early 20th. It is too early to tell if this is that CME or due to another cause. Geomagnetic activity was mainly Quiet, but increased to Unsettled 18/2100-2400 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be Low, with a chance of rising to Moderate from any M-flares that occur due to the number of sunspot regions on the visible disc.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on 15 July, has been forecast to arrive at Earth either late on 19 or early on 20 July, with a chance of G1/Minor Storms, although this may be the source of the current enhancement. The fast wind from a small coronal hole may also enhance the solar wind across Earth on day 1 (19th). Further coronal hole sourced faster solar winds are then possible either late day 3 or day 4 (21st or 22nd). Geomagnetic activity is forecast to be Quiet to Unsettled at first, but with a chance of rising to Active with G1/Minor Storm intervals with any further CME or coronal hole sourced enhancement. This risk recedes day 2 (20th) with mainly Quiet, with isolated Unsettled intervals returning before a further enhancement later day 3 (21st) or more likely day 4 (22nd) to Unsettled to Active with a chance of G1/Minor Storms.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) may increase due to any flares that occur, however there is only a very slight chance of reaching the level of a solar radiation storm.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	50	30	10	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	40	35	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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